

**REPORT NUMBER: SPNCAP305I-CAL-20-002**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
SIDE IMPACT POLE TEST  
FMVSS No. 305 Indicant Test**

**Ford Motor Co.  
2020 Ford Explorer Hybrid  
SUV**

**NHTSA No: M20200204**

**PREPARED BY:  
CALSPAN CORPORATION  
P.O. BOX 400  
BUFFALO, NEW YORK 14225**



**April 6, 2020**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF CRASHWORTHINESS STANDARDS  
MAIL CODE: NRM-110  
1200 NEW JERSEY AVE SE, ROOM W43-410  
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-14-D-00352.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof.

If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: Matthew Pronko  
Matthew Pronko, Test Engineer

Date: April 6, 2020

Approved by: Vanessa Hansen  
Vanessa Hansen, Operations Manager

Date: April 6, 2020

#### **FINAL REPORT ACCEPTANCE BY OCWS:**

\_\_\_\_\_  
Division Chief, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

\_\_\_\_\_  
COTR, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

## TECHNICAL REPORT DOCUMENTATION PAGE

<b>1. Report No.</b> SPNCAP305I-CAL-20-002	<b>2. Government Accession No.</b>	<b>3. Recipient's Catalog No.</b>	
<b>4. Title and Subtitle</b> Final Report of New Car Assessment Program Side Impact Pole Testing of a 2020 Ford Explorer Hybrid SUV NHTSA No.: M20200204		<b>5. Report Date</b> April 6, 2020	
		<b>6. Performing Organization Code</b> CAL	
<b>7. Author(s)</b> Matthew Pronko, Test Engineer Vanessa Hansen, <i>Operations Manager</i>		<b>8. Performing Organization Report No.</b> CAL-DOT-2020-002	
<b>9. Performing Organization Name and Address</b> Calspan Corporation Transportation Test Operations P.O. Box 400 Buffalo, New York 14225		<b>10. Work Unit No.</b>	
		<b>11. Contract or Grant No.</b> DTNH22-14-D-00352	
<b>12. Sponsoring Agency Name and Address</b> U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590		<b>13. Type of Report and Period Covered:</b> Final Test Report March 23, 2020 - April 6, 2020	
		<b>14. Sponsoring Agency Code</b> NRM-110	
<b>15. Supplementary Notes</b>			
<b>16. Abstract</b> An FMVSS No. 305 Inducant test, in conjunction with Side Impact Pole Test (SPNCAP) was conducted on the subject 2020 Ford Explorer Hybrid SUV in accordance with the specifications of the applicable Office of Crashworthiness Standards Test Procedures for the generation of consumer information for the New Car Assessment Program (NCAP). No test failures were reported.			
<b>17. Key Words</b> New Car Assessment Program (NCAP) FMVSS 305 Inducant		<b>18. Distribution Statement</b> <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590 e-mail: <a href="mailto:tis@nhtsa.dot.gov">tis@nhtsa.dot.gov</a> FAX: 202-493-2833	
<b>19. Security Class. (of this report)</b>  UNCLASSIFIED	<b>20. Security Class. (of this page)</b>  UNCLASSIFIED	<b>21. No. of Pages</b>  34	<b>22. Price</b>

## TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	Test Purpose and Procedure	1-1
2	Summary of Test Results	2-1
3	Data Sheets	3-1
 <u>Data Sheet</u>		 <u>Page</u>
1	General Test and Vehicle Parameter Data	3-2
2	Pre-Impact Electric Isolation Measurements & Calculations	3-4
3	Post Impact Electric Isolation Measurements and Calculations	3-5
4	FMVSS No. 305 Static Rollover Results for Electric Vehicles	3-6
 <u>Appendix</u>		 <u>Page</u>
A	Photographs	A-1

## **SECTION 1**

### **TEST PURPOSE AND PROCEDURE**

An FMVSS No. 305 Indicant test, in conjunction with a Side Impact Pole test was conducted on the subject 2020 Ford Explorer Hybrid SUV.

The Indicant test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Test Procedure, dated January 31, 2012 to determine compliance to the requirements of Federal Motor Vehicle Safety Standard (FMVSS) No. 305, "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection" for the purpose of providing consumer information.

This FMVSS No. 305 Indicant test is part of the MY 2020 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-14-D-00352.

## **SECTION 2**

### **SUMMARY OF TEST RESULTS**

A rigid pole side impact test was conducted on a 2020 Ford Explorer Hybrid SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.53 km/h. Electrical isolation measurements were taken immediately post-impact and observations were made related to electrolyte spillage and battery retention. A static rollover was subsequently performed on the subject vehicle and electrical isolation measurements were taken at each stage of the rollover.

Based on the test results, the 2020 Ford Explorer Hybrid SUV appears to meet the requirements for electrolyte spillage, electrical isolation, and battery retention during FMVSS No.305 Indicant testing.

Data sheets, along with pre-test and post-test photographs of the test vehicle are included in this report to document the test.

**SECTION 3**  
**OCCUPANT AND VEHICLE INFORMATION**

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 - General Test and Vehicle Parameter Data

Data Sheet No. 2 – Pre-Impact Electric Isolation Measurements and Calculations

Data Sheet No. 3 – Post-Impact Electric Isolation Measurements and Calculations

Data Sheet No. 4 – FMVSS No. 305 Static Rollover Results for Electric Vehicles

**DATA SHEET NO. 1**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2020 Ford Explorer Hybrid SUV  
 Test Program: NCAP Side Pole Impact Test - FMVSS No.305

NHTSA No.: M20200204  
 Test Date: 3/23/2020

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	M20200204
Model Year	2020
Make	Ford
Model	Explorer
Body Style	SUV
VIN	1FM5K7FW9LGA90809
Body Color	Red
Odometer Reading (km/mi)	169 mi
Engine Displacement (L)	3.3
Type/No. Cylinders	I4
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	10-Speed
Overdrive	Yes
Final Drive	Rear Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Feature	-
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioners	Yes
Rear Pass. Seat Belt Pretensioners	Yes
Driver Load Limiter	Yes
Rear Pass. Load Limiter	Yes
Other Safety Restraint	-

Does owner's manual provide instructions to turn off automatic door locks?

No

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Ford Motor Co.
Date of Manufacture	10/19
Vehicle Type	MPV

GVWR (kg)	2903
GAWR Front (kg)	1329
GAWR Rear (kg)	1619

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	2	7	
Capacity Weight (VCW) (kg)				596	(A)
DSC X 68.04 kg				476.28	(B)
Cargo Weight (RCLW) (kg)				119.72	(A-B)

**VEHICLE SEAT TYPE**

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X						X
Rear or Second Row Seat			X			X	
Third Row seat		X			X		

**DATA SHEET NO. 1 (Continued)**  
**ELECTRIC VEHICLE PARAMETER DATA**

Test Vehicle:	2020 Ford Explorer Hybrid SUV	NHTSA No.:	M20200204
Test Program:	NCAP Side Pole Impact Test - FMVSS No.305	Test Date:	3/23/2020

**ELECTRIC VEHICLE PROPULSION SYSTEM**

Measured Parameter	Value
Type of Electric Vehicle (Electric/Gas-Electric Hybrid/Fuel Cell-Electric Hybrid)	Gas Electric Hybrid
Propulsion Battery Type	Lithium Ion
Nominal Voltage (Volts)	273.6
Is this Vehicle equipped with an Automatic Propulsion Battery Disconnect?	Yes
Physical Location of Automatic Propulsion Battery Disconnect, if applicable	Engine Compartment
Auxiliary Battery Type	12V

**PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED)**

Measured Parameter	Value
Electrolyte Fluid Type	Organic Compound
Electrolyte Fluid Specific Gravity	1.25 g/ml
Electrolyte Fluid Kinematic Viscosity (centistokes)	3.4 mm <sup>2</sup> /s
Electrolyte Fluid Color	Colorless
Propulsion Battery Coolant Type, Color and Specific Gravity (if applicable)	N/A
Location of Battery Modules (Inside or Outside of Passenger Compartment?)	Outside

**PROPULSION BATTERY STATE OF CHARGE**

Measured Parameter	Units	Value
<i>For all battery types:</i> Voltage Range corresponding to <b>useable energy</b> of the battery:		
Minimum State of Charge	V	
Maximum State of Charge	V	
95% of Maximum	V	
Test Voltage *	V	
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i> Voltage range corresponding to <b>useable energy</b> of the battery :		
Minimum State of Charge	V	275
Maximum State of Charge	V	288
95% of Maximum	V	273.6
Test Voltage *	V	274

\* For all battery types-No less than 95% of Maximum Operating Voltage; for batteries that are rechargeable ONLY by an energy source on the vehicle-maximum practicable state of charge within normal operating range.

**VEHICLE CHASSIS GROUND PT(S) LOCATION(S) & PROPULSION BATTERY SYSTEM**

Measured Parameter	Value
Details of Vehicle Chassis Ground Points & Locations	The ground point is located on the underbody
Details of Propulsion Battery Components	The HV leads are connected to the HV battery located on the rear underbody area

**DATA SHEET NO. 2**  
**PRE-IMPACT ISOLATION MEASUREMENTS AND CALCULATIONS**

Test Vehicle: 2020 Ford Explorer Hybrid SUV  
 Test Program: NCAP Side Pole Impact Test - FMVSS No.305

NHTSA No.: M20200204  
 Test Date: 3/23/2020

**VOLTMETER INFORMATION**

Measured Parameter	Units	Value
Make & Model		Fluke 87
Serial No.		65280327
Internal Impedance Value	MΩ	10
Resolution	V	0.001
Last Calibration Date		7/10/2019

**NOTES:**

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

**PROPULSION BATTERY VOLTAGE, RESISTANCE &  
ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS**

Measured Parameter	Symbol	Units	Value
Normal operating voltage range specified by the manufacturer	$V_b$	V	275-288
Propulsion Battery Voltage : (ready to drive position)	$V_b$	V	274
Propulsion Battery to Vehicle Chassis	$V_1$	V	93
Propulsion Battery to Vehicle Chassis	$V_2$	V	93
Propulsion Battery to Vehicle Chassis Across Known Resistor	$R_o$	Ω	151600
Propulsion Battery to Vehicle Chassis with $R_o$ installed	$V_1'$	V	4.2
Propulsion Battery to Vehicle Chassis with $R_o$ installed	$V_2'$	V	4.2
$R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1']$	$R_{i1}$	Ω	6411000
$R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2']$	$R_{i2}$	Ω	6411000
Lesser value of $R_{i1}$ and $R_{i2}$	$R_i$	Ω	6411000
Electrical Isolation Value (Minimum E.I. Value is 500 Ω/V)	$R_i/V_b$	Ω/V	23396

Is the Electrical Isolation Value  $\geq 500 \Omega/V$  (Yes/No)? X Yes  No (Fail)

**NOTES:**

- The measurement shall be made with the propulsion battery connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (propulsion motor(s) activated) position.
- If the voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.
- The known resistance  $R_o$  (in Ohms) should be approximately 500 times the nominal operating voltage of the vehicle (in volts) per SAE J1766
- If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant

**COMMENTS:** None

**DATA SHEET NO. 3**  
**POST-IMPACT ISOLATION MEASUREMENTS AND CALCULATIONS**

Test Vehicle: 2020 Ford Explorer Hybrid SUV  
 Test Program: NCAP Side Pole Impact Test - FMVSS No.305

NHTSA No.: M20200204  
 Test Date: 3/23/2020

**VOLTMETER INFORMATION**

Measured Parameter	Units	Value
Make & Model		Fluke 87
Serial No.		65280327
Internal Impedance Value	MΩ	10
Nominal Propulsion Battery Voltage (V <sub>b</sub> )	V	274

**NOTES:**

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

**ELECTRICAL ISOLATION MEASUREMENTS & IMPACT CALCULATIONS**

Parameter	Value	Units		Value		Value	
V <sub>1</sub> =	113.8	V	Impact Time:	4	Minutes	14	Seconds
V <sub>2</sub> =	116.5	V	Impact Time:	4	Minutes	33	Seconds
R <sub>o</sub> =	151600	Ω	Impact Time:		Minutes		Seconds
V <sub>1</sub> ' =	10	V	Impact Time:	4	Minutes	40	Seconds
V <sub>2</sub> ' =	10.2	V	Impact Time:	4	Minutes	57	Seconds
R <sub>i1</sub> =	3185000	Ω	Impact Time:	4	Minutes	44	Seconds
R <sub>i2</sub> =	3123000	Ω	Impact Time:	5	Minutes	3	Seconds
R <sub>i</sub> =	3123000	Ω	Impact Time:	5	Minutes	10	Seconds
R <sub>i</sub> /V <sub>b</sub> =	11399	Ω/V	Impact Time:	5	Minutes	11	Seconds

Is the Electrical Isolation Value ≥ 500 Ω/V (Yes/No)? X Yes  No (Fail)

**NOTES:**

- $R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1]$ ,  $R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2]$ ,  $R_i$  = Lesser value of  $R_{i1}$  and  $R_{i2}$
- If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant
- Minimum Electrical Isolation Value is 500 Ω/V

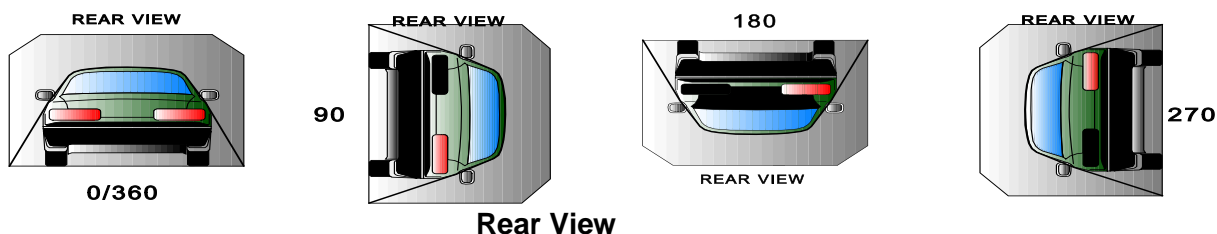
**PROPULSION BATTERY SYSTEM COMPONENTS**

Measured Parameter	Comments	Passed	Failed
Propulsion Battery Module movement within the passenger compartment	No Movement	X	
Intrusion of an outside Propulsion Battery Component into the passenger compartment	No Intrusions	X	
Is propulsion battery electrolyte spillage visible in the passenger compartment?		X	

**DATA SHEET NO. 4**  
**FMVSS NO. 305 STATIC ROLLOVER RESULTS FOR ELECTRIC POWERED VEHICLES**

Test Vehicle: 2020 Ford Explorer Hybrid SUV  
 Test Program: NCAP Side Pole Impact Test - FMVSS No.305

NHTSA No.: M20200204  
 Test Date: 3/23/2020



**DETERMINATION OF PROPULSION BATTERY ELECTROLYTE COLLECTION TIME PERIOD**

Rollover Stage	Rotation Time (spec. 1 -3 min)		FMVSS 301 Hold Time	Total Time		Next Whole Minute Interval
	Minutes	Seconds		Minutes	Seconds	
0° to 90°	1	8	5	6	8	7
90° to 180°	1	10	5	6	10	7
180° to 270°	1	8	5	6	8	7
270° to 360°	1	9	5	6	9	7

**ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE**

Rollover Stage	Propulsion Battery Electrolyte Spillage	Units	Spillage Location
0° to 90°	0.0	Liters	None
90° to 180°	0.0	Liters	None
180° to 270°	0.0	Liters	None
270° to 360°	0.0	Liters	None
<b>Total Spillage</b>	<b>0.0</b>	<b>Liters</b>	<b>None</b>

\* FMVSS 305 Requirements: Maximum allowable propulsion battery electrolyte spillage is **5.0 Liters**

Is the total spillage of propulsion battery electrolyte greater than 5.0 Liters? ☐ Yes (Fail) ☒ No  
 Is propulsion battery electrolyte spillage visible in the passenger compartment? ☐ Yes (Fail) ☒ No

**VOLTMETER INFORMATION**

Measured Parameter	Units	Value
Make & Model		Fluke 87
Serial No.		65280327
Internal Impedance Value	MΩ	10
Nominal Propulsion Battery Voltage (V <sub>b</sub> )	V	217.6

**NOTES:**

- The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10 MΩ
- An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

**DATA SHEET NO. 4 (Continued)**  
**FMVSS NO. 305 STATIC ROLLOVER RESULTS FOR ELECTRIC POWERED VEHICLES**

Test Vehicle: 2020 Ford Explorer Hybrid SUV  
 Test Program: NCAP Side Pole Impact Test - FMVSS No.305

NHTSA No.: M20200204  
 Test Date: 3/23/2020

**ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS**

Parameter	Rollover Stage	Value	Units		Minutes	Seconds
$V_1 =$	90°	93.1	V	Time:	3	31
	180°	93.1	V		9	27
	270°	93.2	V		15	36
	360°	93.4	V		21	45
$V_2 =$	90°	93.3	V	Time:	3	39
	180°	93.3	V		9	33
	270°	93.3	V		15	40
	360°	93.1	V		21	59
$V_1' =$	90°	4.26	V	Time:	4	21
	180°	4.22	V		9	48
	270°	4.23	V		15	49
	360°	4.26	V		22	6
$V_2' =$	90°	4.28	V	Time:	4	37
	180°	4.31	V		9	56
	270°	4.29	V		15	55
	360°	4.27	V		22	32
$R_{i1} =$	90°	6333000	$\Omega$	Time:	4	22
	180°	6393000	$\Omega$		9	50
	270°	6381000	$\Omega$		15	53
	360°	6334000	$\Omega$		22	8
$R_{i2} =$	90°	6300000	$\Omega$	Time:	4	40
	180°	6254000	$\Omega$		9	59
	270°	6287000	$\Omega$		16	0
	360°	6318000	$\Omega$		22	37
$R_i =$	90°	6300000	$\Omega$	Time:	4	40
	180°	6254000	$\Omega$		10	3
	270°	6287000	$\Omega$		16	2
	360°	6318000	$\Omega$		22	40
$R_i/V_b =$	90°	22907	$\Omega/V$	Time:	4	44
	180°	22740	$\Omega/V$		10	3
	270°	22864	$\Omega/V$		16	7
	360°	22974	$\Omega/V$		22	54

Is the Electrical Isolation Value  $\geq 500 \Omega/V$  (Yes/No)?



Yes



No (Fail)

**DATA SHEET NO. 4 (Continued)**  
**FMVSS NO. 305 STATIC ROLLOVER RESULTS FOR ELECTRIC POWERED VEHICLES**

Test Vehicle: <u>2020 Ford Explorer Hybrid SUV</u>	NHTSA No.: <u>M20200204</u>
Test Program: <u>NCAP Side Pole Impact Test - FMVSS No.305</u>	Test Date: <u>3/23/2020</u>

**NOTES:**

- $R_{i1} = R_o * (1 + V_2/V_1) * [(V_1 - V_1')/V_1]$ ,  $R_{i2} = R_o * (1 + V_1/V_2) * [(V_2 - V_2')/V_2]$ ,  $R_i = \text{Lesser value of } R_{i1} \text{ and } R_{i2}$ ,  
 $R_i/V_b = \text{Electrical Isolation Value/ Nominal Battery Voltage}$
- $V_1$ ,  $V_2$ ,  $V_1'$ , &  $V_2'$  voltage measurements were recorded at the start of each successive increment of **90°**, **180°**, **270°**, and **360°** of the static rollover test. The increment of rotation for each turn was completed within a maximum of 3 minutes.
- If measured voltage is zero and results in a division by zero, record "Zero Volts." This "zero voltage" condition is considered as being compliant
- Minimum Electrical Isolation Value is 500  $\Omega/V$

**COMMENTS:** None

---



---



---

**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
1	Auxiliary Power Module Warning Label	A-3
2	Power Inverter Warning Label	A-3
3	First Responder Warning Label	A-4
4	First Responder Cut Location	A-4
5	Manual High Voltage Service Disconnect Location	A-5
6	Manual High Voltage Service Disconnect Removed (Plug)	A-5
7	Manual High Voltage Service Disconnect Removed Location	A-6
8	Pre-Impact View of Propulsion Battery	A-6
9	Post-Impact Front View of Propulsion Battery	A-7
10	Post-Impact Rear View of Propulsion Battery (if any part of it is visible)	A-7
11	Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-8
12	Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules	A-8
13	Pre-Impact View of Propulsion Battery Module(s)	A-9
14	Post-Impact View of Propulsion Battery Module(s)	A-9
15	Pre-Impact View of Electric Propulsion Drive	A-10
16	Post-Impact View of Electric Propulsion Drive	A-10
17	Pre-Impact View of High Voltage Interconnects	A-11
18	Pre-Impact View of Ground Lead Attached	A-11
19	Pre-Impact View of High Voltage Leads Attached	A-12
20	Pre-Impact View of Installed Test Interface Port	A-12
21	Post-Impact View of Installed Test Interface Port	A-13
22	FMVSS No. 305 Static Rollover 0 Degrees	A-13
23	FMVSS No. 305 Static Rollover 90 Degrees	A-14
24	FMVSS No. 305 Static Rollover 180 Degrees	A-14
25	FMVSS No. 305 Static Rollover 270 Degrees	A-15
26	FMVSS No. 305 Static Rollover 360 Degrees	A-15
27	Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-16
28	Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery	A-16
29	Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)	A-17
30	Post-Impact View of Battery Component Intrusion (if applicable)	A-17
31	Post-Impact View of Battery Module Movement or Retention Loss (if applicable)	A-18
32	Post-Impact View of Propulsion Battery Electrolyte Spillage Location (if applicable)	A-18
33	As-Delivered Right Front 3/4 View of Test Vehicle	A-19
34	As-Delivered Left Rear 3/4 View of Test Vehicle	A-19
35	Close-Up View of Vehicle's Certification Label	A-20
36	Close-Up View of Vehicle's Tire Information Placard or Label	A-20



Figure A-1: Auxiliary Power Module Warning Label

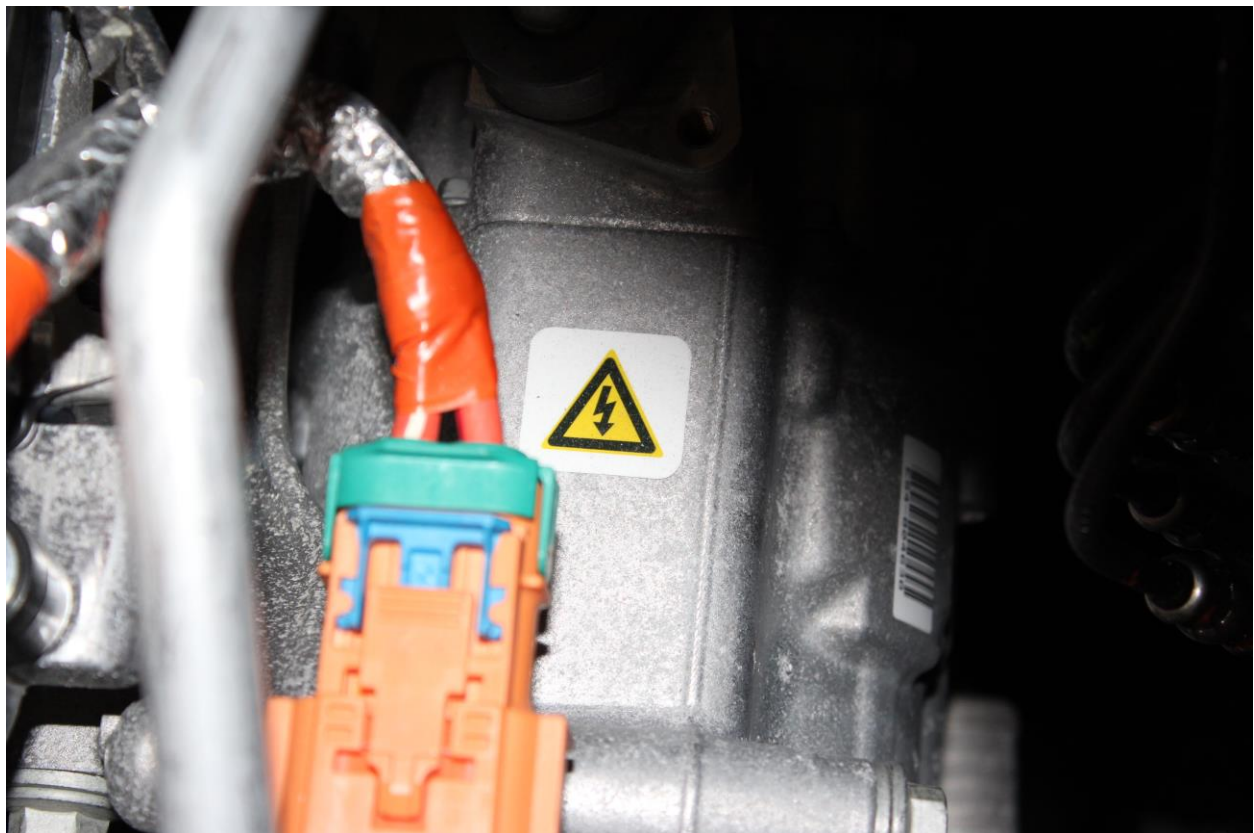


Figure A-2: Power Inverter Warning Label

**Photo Not Applicable**

**Figure A-3 First Responder Warning Label**

**Photo Not Applicable**

**Figure A-4: First Responder Cut Location**



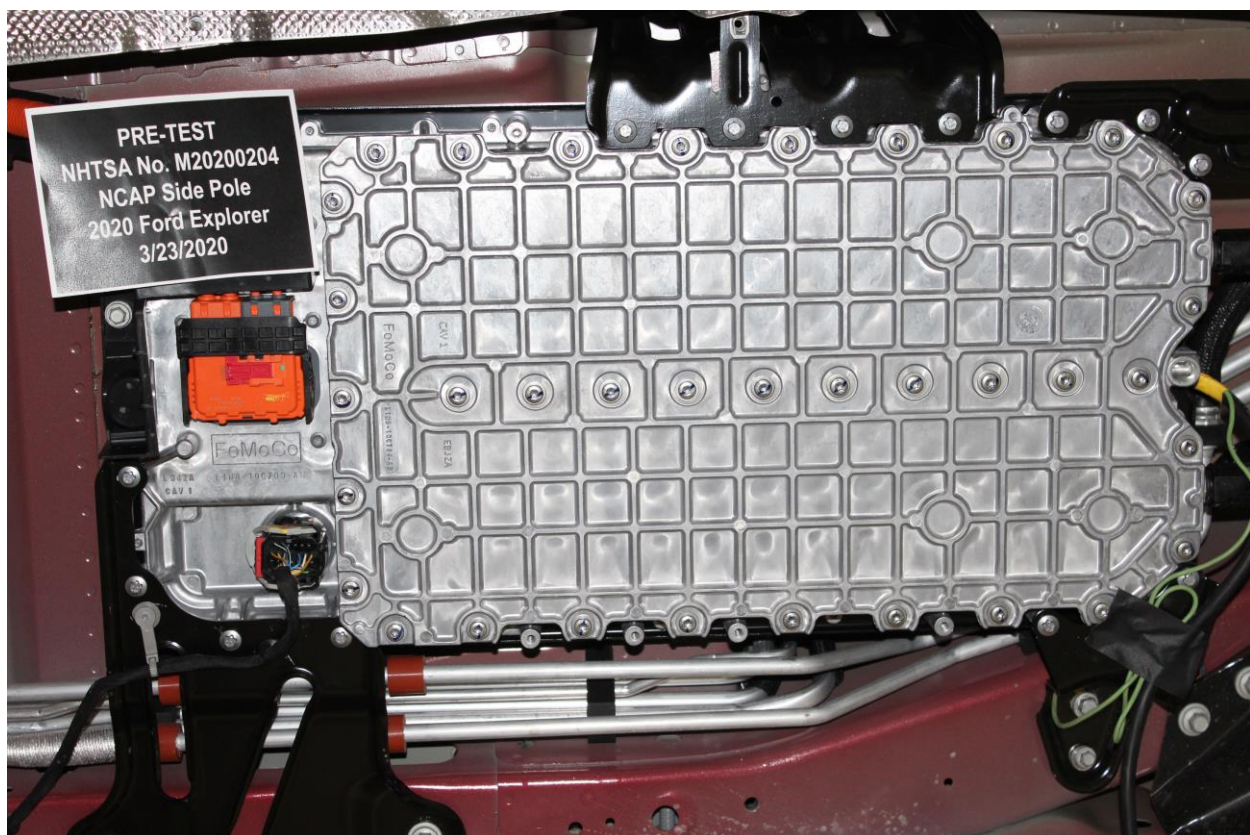
**Figure A-5: Manual High Voltage Service Disconnect Location**



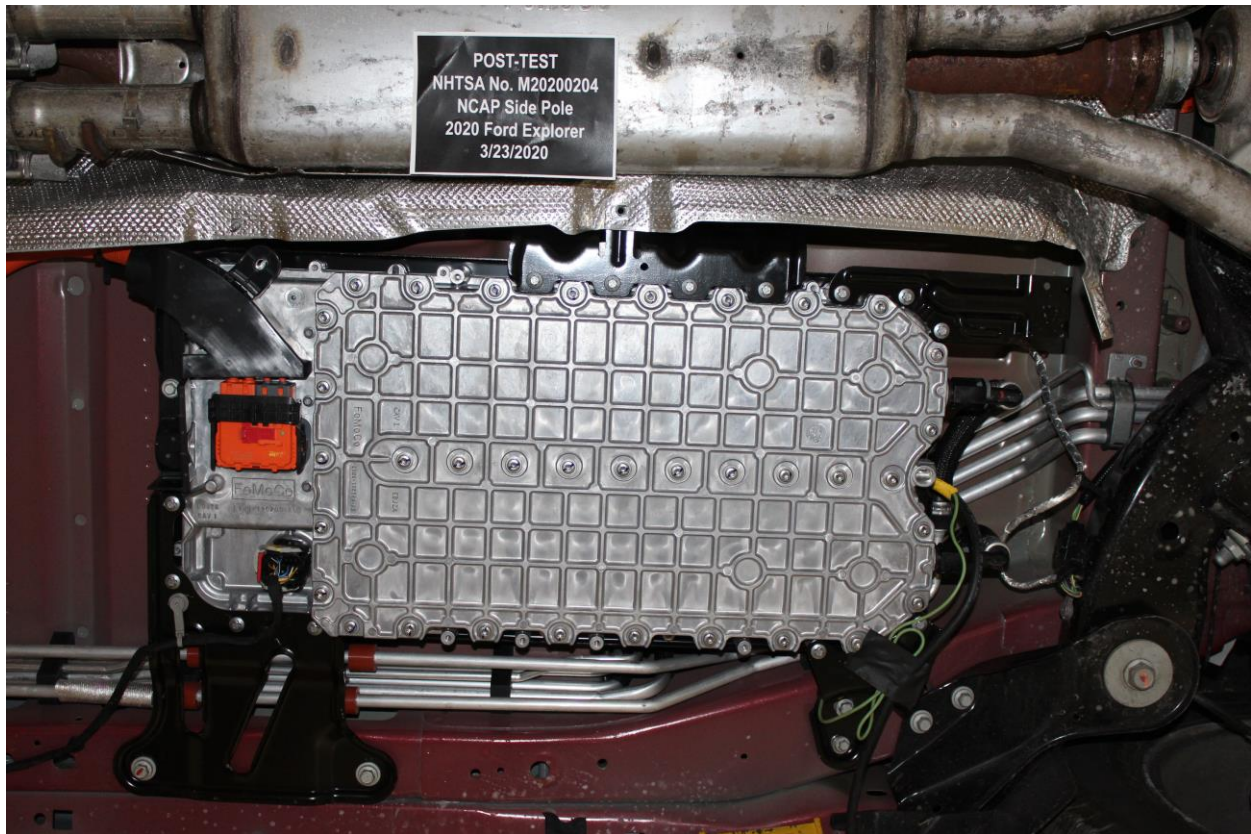
**Figure A-6: Manual High Voltage Service Disconnect Removed (Plug)**



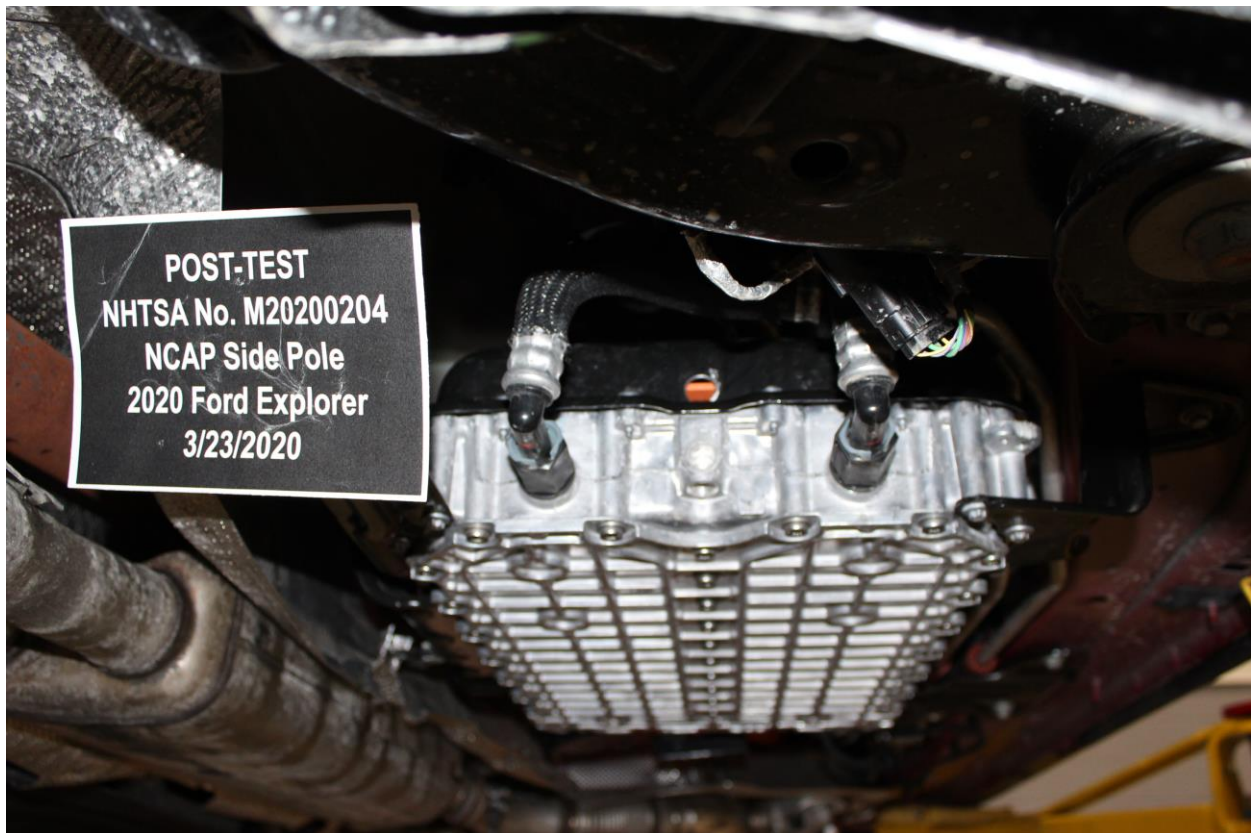
**Figure A-7: Manual High Voltage Service Disconnect Removed Location**



**Figure A-8: Pre-Impact View of Propulsion Battery**



**Figure A-9: Post-Impact Front View of Propulsion Battery**



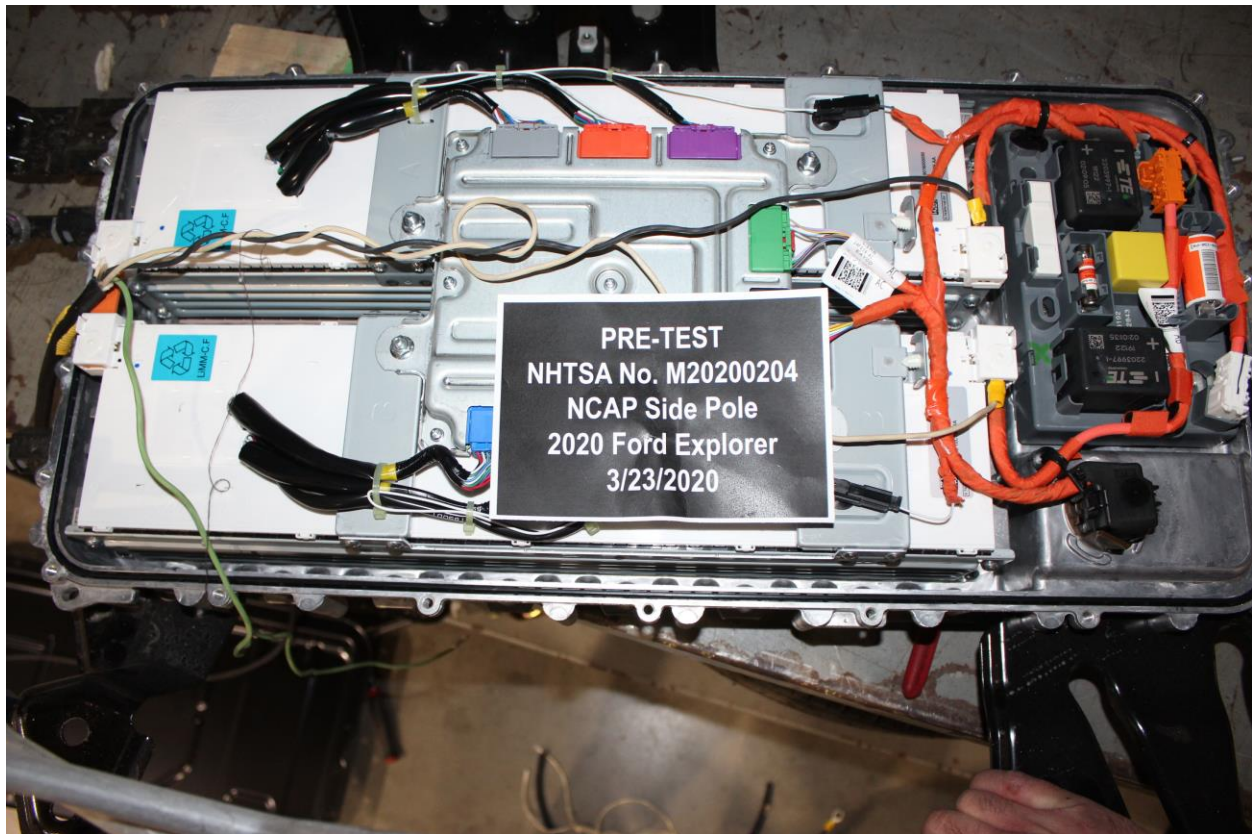
**Figure A-10: Post-Impact Rear View of Propulsion Battery (if any part of it is visible)**



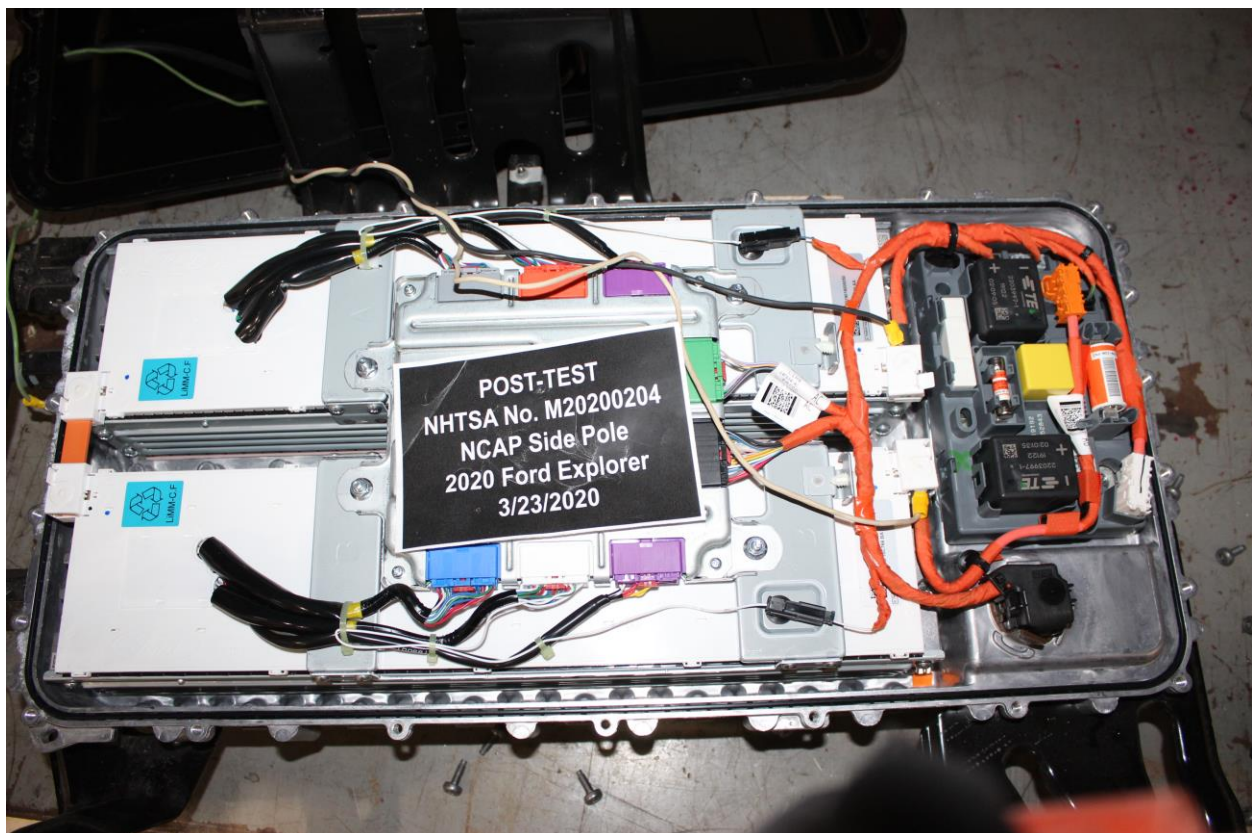
**Figure A-11: Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules**



**Figure A-12: Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules**



**Figure A-13: Pre-Impact View of Propulsion Battery Module(s)**



**Figure A-14: Post-Impact View of Propulsion Battery Module(s)**



**Figure A-15: Pre-Impact View of Electric Propulsion Drive**



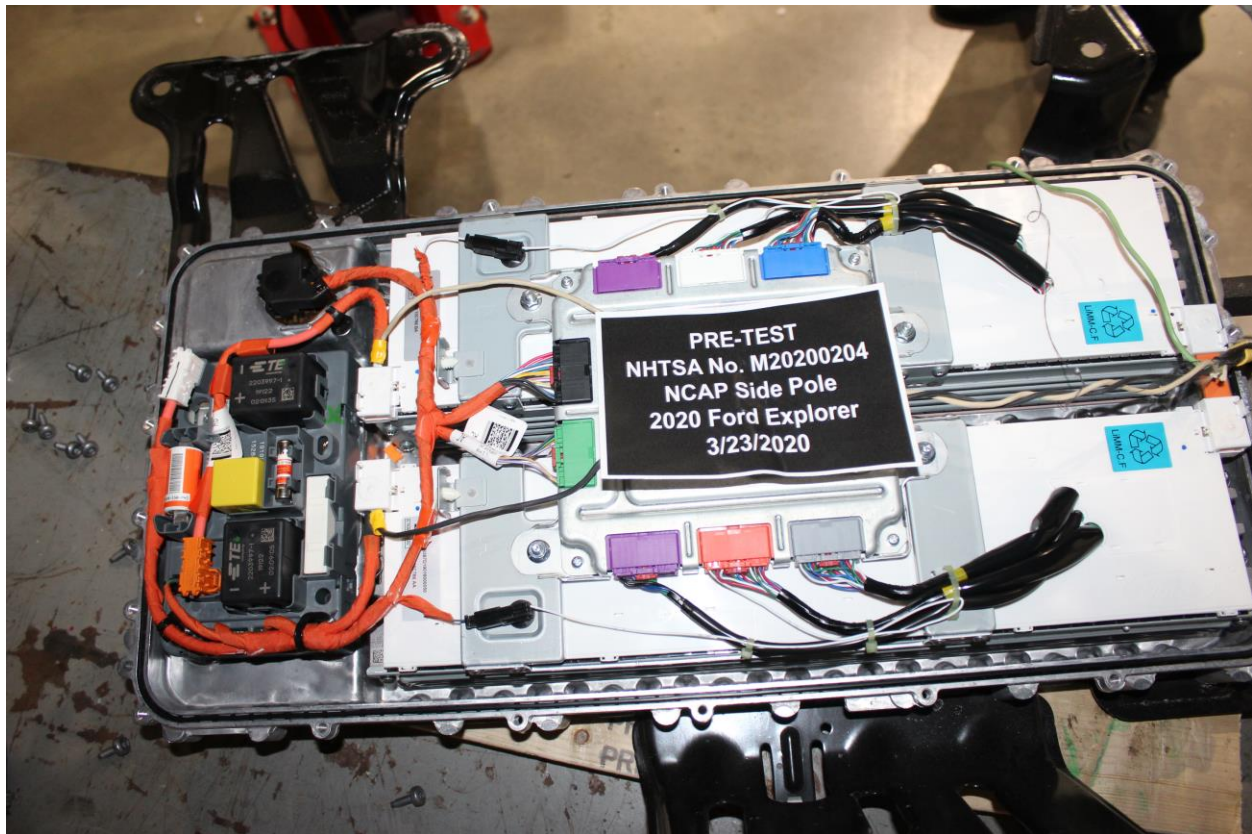
**Figure A-16: Post-Impact View of Electric Propulsion Drive**



Figure A-17: Pre-Impact View of High Voltage Interconnects



Figure A-18: Pre-Impact View of Ground Lead Attached



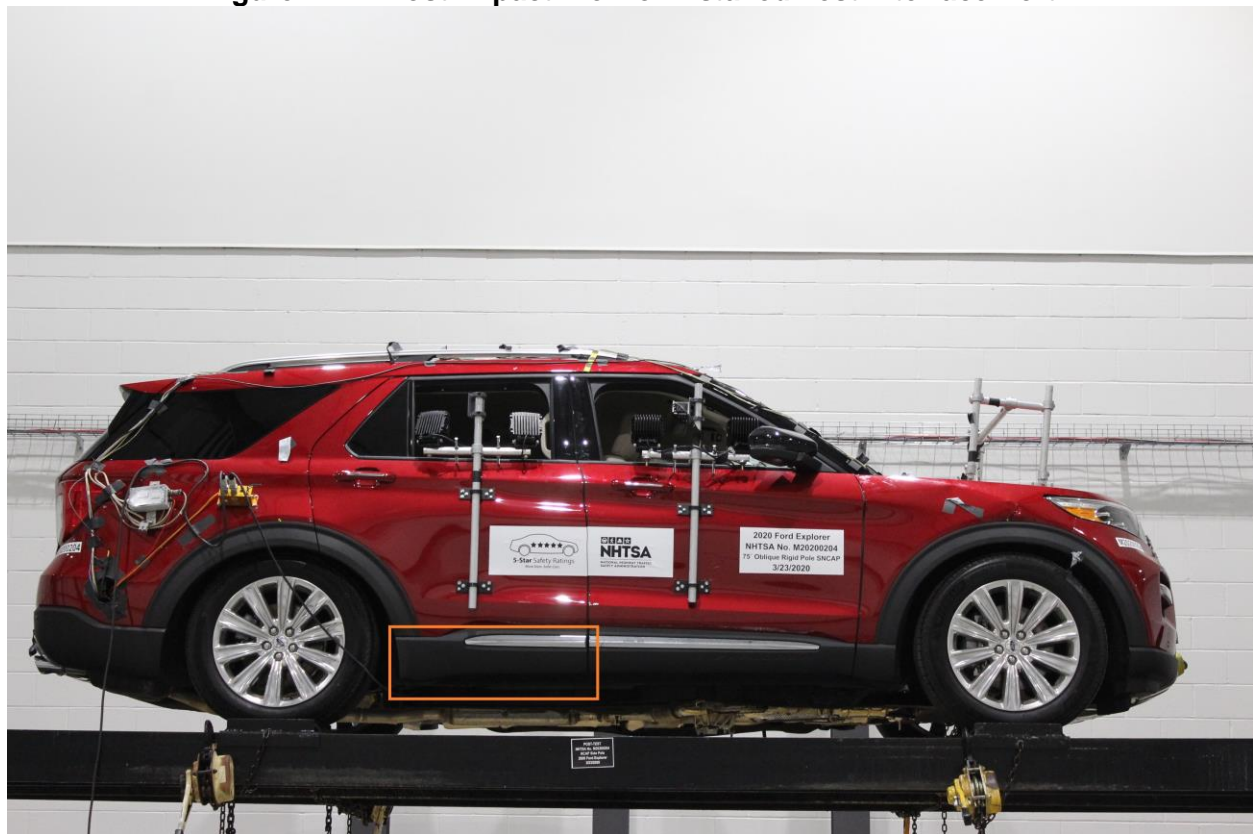
**Figure A-19: Pre-Impact View of High Voltage Leads Attached**



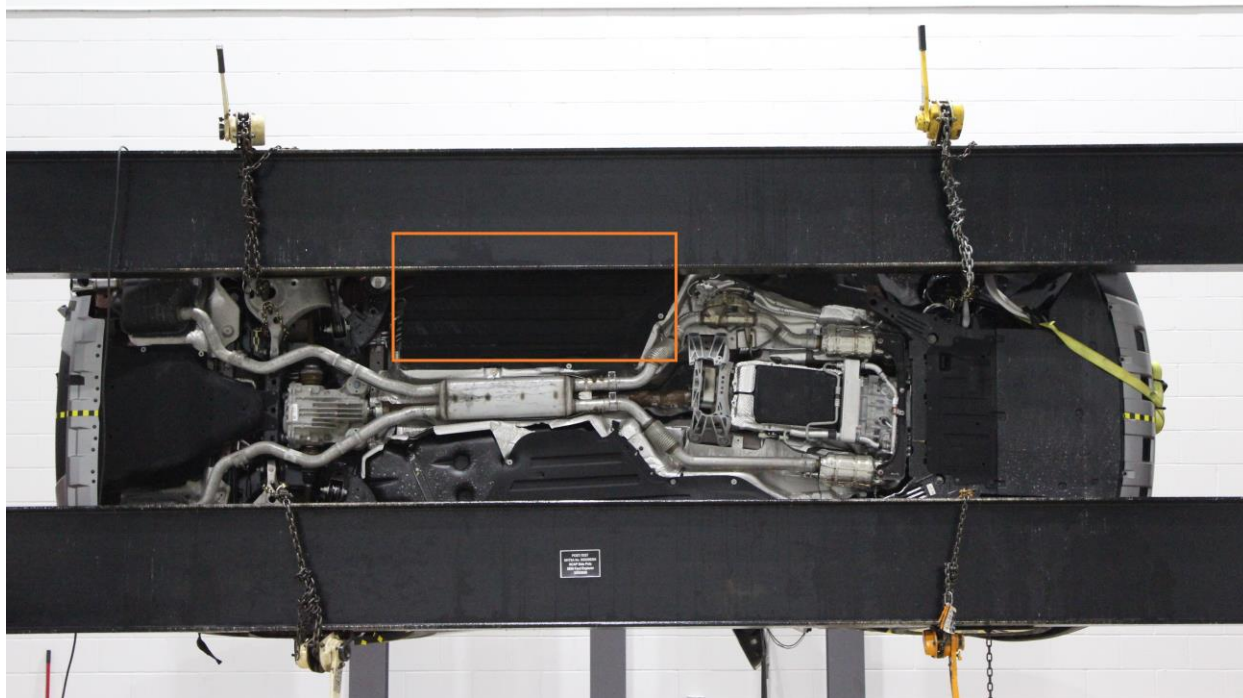
**Figure A-20: Pre-Impact View of Installed Test Interface Port**



**Figure A-21: Post-Impact View of Installed Test Interface Port**



**Figure A-22: FMVSS No. 305 Static Rollover 0 Degrees**



**Figure A-23: FMVSS No. 305 Static Rollover 90 Degrees**



**Figure A-24: FMVSS No. 305 Static Rollover 180 Degrees**



**Figure A-25: FMVSS No. 305 Static Rollover 270 Degrees**



**Figure A-26: FMVSS No. 305 Static Rollover 360 Degrees**



**Figure A-27: Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery**



**Figure A-28: Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery**

# Photo Not Applicable

**Figure A-29: Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)**

# Photo Not Applicable

**Figure A-30: Post-Impact View of Battery Component Intrusion (if applicable)**

# **Photo Not Applicable**

**Figure A-31: Post-Impact View of Battery Module Movement or Retention Loss (if applicable)**

# **Photo Not Applicable**

**Figure A-32: Post-Impact View of Propulsion Battery Electrolyte Spillage Location (if applicable)**



**Figure A-33: As-Delivered Right Front 3/4 View of Test Vehicle**



**Figure A-34: As-Delivered Left Rear 3/4 View of Test Vehicle**

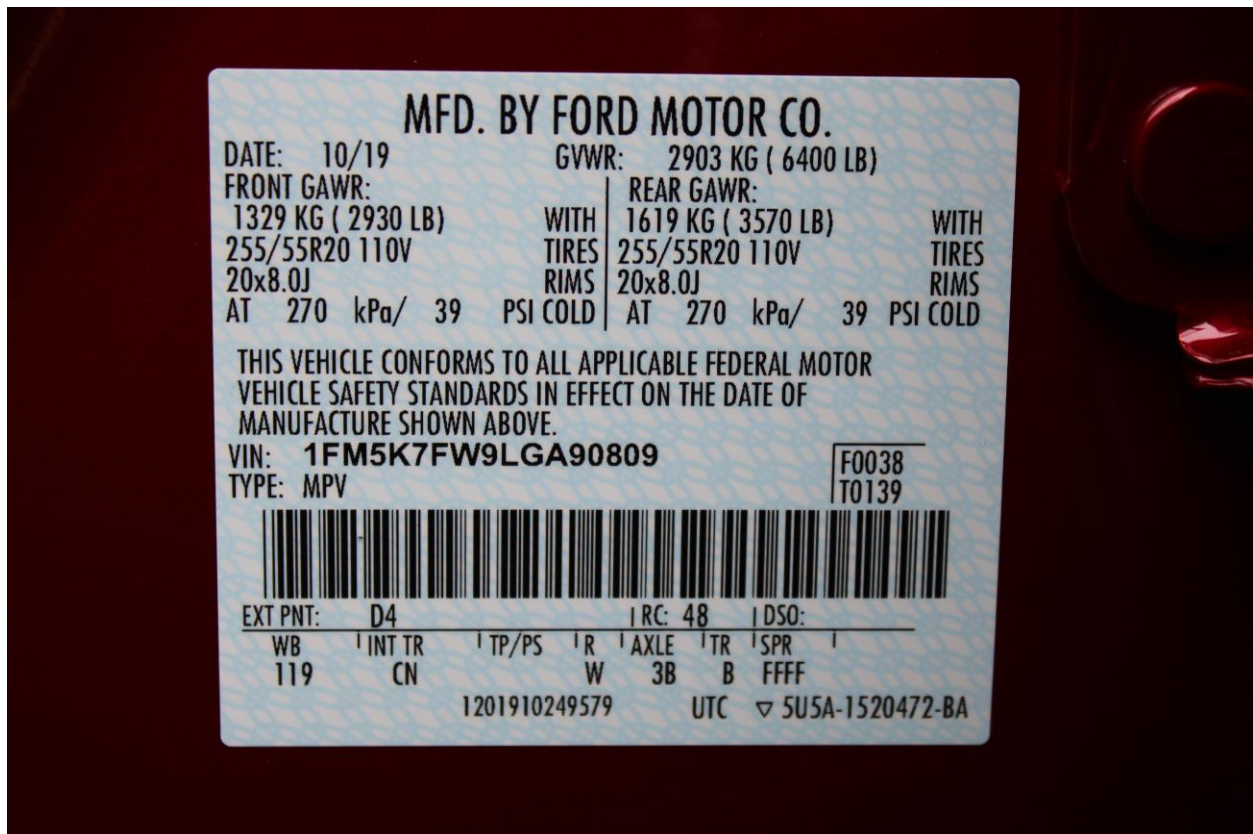


Figure A-35: Close-Up View of Vehicle's Certification Label

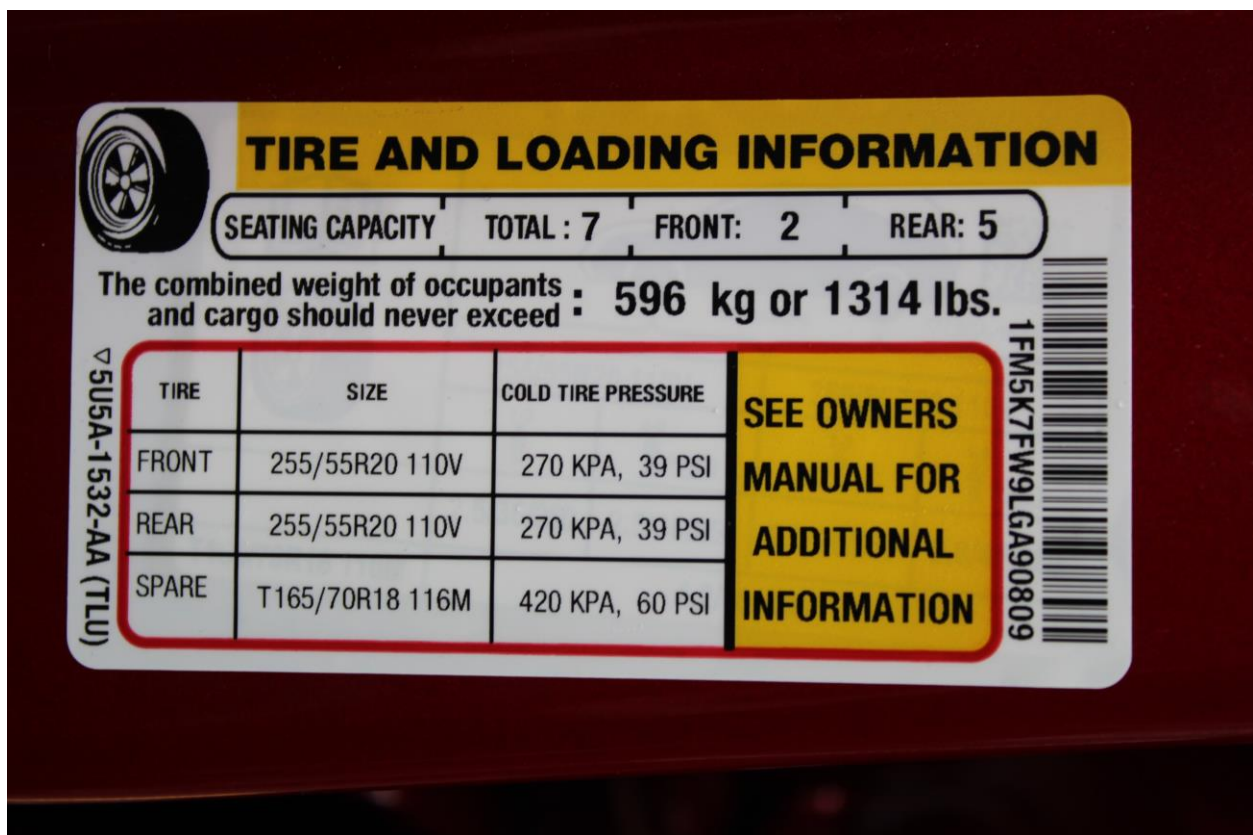


Figure A-36: Close-Up View of Vehicle's Tire Information Placard or Label